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137 Despite the wealth of place-names and the strongly accentuated configuration which the nomenclature expresses, Seriland is one of the most hopeless deserts of the American hemisphere.

ACKNOWLEDGMENTS

122 Since most of the field work of the two expeditions lay in the neighboring Republic of Mexico, it became necessary to ask official sanction for the operations from the Mexican government; and it is a pleasure to say that every possible privilege and courtesy were extended by both federal and state officials. Especial acknowledgments are due to 000 the Mexican minister (and afterward ambassador) to the United States, his Excellency Don Mateo Romero (now deceased); to the Ministro de Fomento of the Mexican Republic, Excelencia Don Fernando Leal; and to the governor of the State of Sonora, Señor Don Ramón Corral. Equal acknowledgments are due to various United States officials, notably Honorable W. Woodville Rockhill, First Assistant Secretary of State when the expeditions were planned; and it is a pleasure to advert to the active interest taken in both expeditions by Honorable S. P. Langley, Secretary of the Smithsonian Institution, and to the careful attention given the 1894 expedition by the late Dr G. Brown Goode, Assistant Secretary of the Institution.

114 Mr Willard D. Johnson did invaluable service in connection with the second expedition, particularly in the execution of surveys and the 126 construction of maps in inimitable style. Mr William Dinwiddie is to be credited with the excellent photographs made during the 1894 expedition, with the representation of the devices used in Seri face-painting, and with various other aids to the investigation; while Mr J. W. Mitchell is to be credited with the photographs made on Isla Tiburon, and with other contributions to the success of the 1895 expedition. 000 Acknowledgments are due also to all of the participants in both expeditions, whose names appear in other paragraphs. Their contributions were not primarily intellectual, yet were of a kind and amount to be forever remembered among men who have worked and hungered and thirsted and stood guard together. The deepest debt connected with the field work is to the now venerable but ever vigorous pioneer, Señor Pascual Encinas; and no small part of this debt goes over to his estimable spouse, Señora Anita Encinas, who twice traversed the long road from Hermosillo to Costa Rica in the interest of the 1895 expedition.

The scientific results of the researches have been enriched by invaluable contributions from Director Powell's store of ethnologic knowledge, and by suggestions from Messrs Frank Hamilton Cushing, F. W. Hodge, James Mooney, and other collaborators in the Bureau of American Ethnology. The qualities of the colored illustrations are 114 due largely to the artistic skill of Mr Wells M. Sawyer, by whom they were designed, and of Mr DeLancey Gill, by whom the proofs were revised. The Spanish translations are due chiefly to Colonel F. F.

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ejectamenta, as at Pico Pinacate, in northwestern Sonora. The various rocks are usually bare or meagerly mantled with talus in the mountains; over the greater part of the plains they are commonly veneered with sheetflood deposits, ranging from a few inches to a few yards in thickness; while the central portions of the larger valleys are lined with alluvial accumulations reaching many hundreds of feet in thickness. 133

The clearly interpretable geologic history began with extensive degradation and eventual baseleveling of a granitic terrane in Paleozoic or early Mesozoic time; then followed the deposition of the shales and associated limestones during the later Mesozoic; next came elevation, accompanied or followed by corrugation, chiefly in folds parallel with the present coast, whereby the granite-based sierras were produced, and accompanied also by the earlier vulcanism to which the volcanic sierras owe their existence. A vast period of degradation ensued, during which the land stood so high as to induce greater precipitation than that of today and to permit the streams to carve channels far below the present level of tide, and during which the present general configuration was developed; then came the southwestward tilting and consequent climatal desiccation, the filling of the deeper valleys, the inauguration of sheetflood erosion, some local vulcanism, and the progressive shifting of the divides.

The geologic structure affects the hydrography, especially that factor determined by subterranean circulation, or ground-water; for the superficial sheetflood and alluvial deposits are highly pervious and many of the volcanics hardly less so, while the shales and limestones are but slightly pervious and the granites nearly impervious. The 134
geologic structure also determines the character of the soil with exceptional directness, since the dryness of the air and the dearth of vegetation reduce rock decay to a negligible quantity. The characteristically precipitous sierras and cerros are of naked ledges, save where locally mantled with a mechanical debris of the same rocks (much finer than the frost product of colder and humider regions); the soil of the normal plains is but the little-oxidized upper surface of sheetflood deposits made up of the mechanical debris of local rocks and varying in coarseness with the slope; while the soil of the valleys is detrital sand and silt, derived from tributary slopes, passing into adobe where conditions are fit, and essentially mechanical in texture and structure save where cemented by ground-water solutions at the lower levels.

FLORA

The flora of the Sonoran province affords a striking example of the 137
adjustment of vegetal life to an unfavorable environment. The prevailing vegetation is perennial, of slow growth and of stunted aspect; and it is not distributed uniformly but arranged in separate tufts or clusters, gathering into a nearly continuous mantle in wetter spots, though commonly dotting the plains sparsely, to completely disappear

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137 in the driest areas. Nearly all of the plants have roots of exceptional length, and are protected from evaporation by a glazed epidermis and from animal enemies by thorns or by offensive odors and flavors; while most of the trees and shrubs are practically leafless except during the humid seasons. Grasses are not characteristic, and there is no sward, even in cases; but certain grasses grow in the shadow of the arborescent tufts and in the fields of the farmer ants, or spring up in scattered blades over the moister portions of the surface. The arborescent vegetation represents two characteristic types, viz, (1) trees and shrubs allied to those of humid lands, but modified to fit arid conditions; and (2) distinctive forms, evidently born of desert conditions and not adapted to a humid habitat, this type comprising the cacti and related forms, as well as forms apparently intermediate between the cacti and normal arborescent type. The various plants of the district, including those of the distinctive types, are communal or commensal, both among themselves and with animals, to a remarkable degree; for their common strife against the hard physical environment has forced them into cooperation for mutual support. The tufts or clusters in which the vegetation is arranged express the solidarity of life in the province; commonly each cluster is a vital colony, made up of plants of various genera and orders, and forming a home for animal life also of different genera and orders; and, although measurably inimical, these various organisms are so far interdependent that none could survive without the cooperation of the others.[1]

In Seriland proper, as in other parts of the Sonoran province, a prevailing tree is the mesquite (*Prosopis juliflora*); on the alluvial fan of Rio Sonora it grows in remarkable luxuriance, forming (with a few other trees) a practically continuous forest 20 to 40 feet in height, the gnarled trunks sometimes reaching a diameter of 2 or 3 feet; over the Rio Bacuache fan and much of the remaining plain surface it forms the dominant tree in the scattered vital colonies; and here and there it pushes well into the canyon gorges. The roots of the mesquite are of great length, and are said to penetrate to water-bearing strata at depths of 50 to 75 feet; its fruit consists of small hard beans embedded in slender woody pods. Associated with the mesquite in most stations are the still more scraggy and thorny cat-claw (*Acacia greggii*) and ironwood (*Olneya tesota*), both also yielding woody beans in limited quantity. Similarly associated, especially in the drier tracts, and characteristically abundant over the plains portions of Isla Tiburon, are the paloverdes (*Parkinsonia torreyana*, etc), forming scraggy, wide-branching, green-bark trees 5 to 15 feet high, and commonly 3 to 10 inches in diameter of trunk. Over the mountain sides, especially of Sierra Seri and Sierra Kunkaak, grow sparsely the only straight-trunk trees of the region, rooted in the rocks to the average number of a few score to the square

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[1] The vital characteristics of the region have been described in some detail in The Beginning of Agriculture, American Anthropologist, vol. VIII, 1895, pp. 350-376; The Beginning of Zoculture, American Anthropologist, vol. X, 1897, pp. 295-308; and Expedition to Seriland, Science, vol. III, 1896, pp. 483-505.

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● 137 mile; this is the paloblanco (*Acacia willardiana*). Associated with it along rocky barrancas of permanent water supply is a fig tree (*Ficus palmeri*), which has a habit of springing from the walls and crests of cliffs, and sending white-bark roots down the cliff-faces to the water 50 or 100 feet below, and which yields a small, insipid, and woody fruit. Interspersed among the larger trees, and spreading over the intervening spaces, particularly in the drier and more saline spots, grow a number of thorny shrubs, much alike in external appearance and habit, though representing half a dozen distinct genera (*Cassia*, *Microrhamnus*, *Celtis*, *Krameria*, *Acacia*, *Randia*, *Stegnosperma*, *Frankenia*, etc), while considerable tracts are sparsely occupied by straggling tufts of the Sonoran

FIG. 4—Beyond Encinas desert—the saguaro.

greasewood, or creosote bush (*Larrea tridentata*), whose minute but bright green leafage relieves that prevailing gray of the landscape in which the lighter greens of the paloverde and cactus stems are lost.

Intermingling with the woody trees and shrubs in most stations, and replacing them in some, are the conspicuous and characteristic cacti in a score of forms. East of Desierto Encinas, and sometimes west of it, these are dominated by the saguaro (*Cereus giganteus*), though throughout most of Seriland the related saguesa (*Cereus pringlei?*) prevails. The saguaro is a fluted and thorn-decked column, 1 foot to 3 feet in diameter and 10 to 60 feet in height, sometimes branching into a candelabrum, while the still more monstrous sagueaa (figure 4) usually consists of from three to ten such columns springing from a

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137 single root; both are masses of watery pulp, revived and renewed during each humid season, and both flower in a crown of fragrant and brilliant blossoms at or near the top of column or branch, and fruit in fig-like tunas (or prickly pears) during late summer or early autumn. Ordinarily the saguaro, like the sahuaro, is sparsely distributed; but there is an immense tract between Desierto Encinas and the eastern base of Sierra Seri in which it forms a literal forest, the giant trunks close-set as those of trees in normal woodlands. Hardly less imposing than the giant cactus is the wide-branching species known as pitahaya (*Cereus thurberi?*), in which the trunks may be ten to fifty in number, each 4 to 8 inches in diameter and 5 to 40 feet in height; and equally conspicuous, especially in eastern Seriland, is the cina (*Cereus schotti*), which is of corresponding size, and differs chiefly in the simpler fluting of the thorn-protected columns. Both the pitahaya and the cina flower and fruit like the saguaro, the tunas yielded by the former being especially esteemed by Mexicans as well as Indians. Another important cactus is the visnaga (*Echinocactus wislizeni lecontei*), which rises in a single trunk much like the saguaro, save that it is commonly but 3 to 6 feet in height and is protected by a more effective armature of straight and curved thorns; it yields a pleasantly acid, pulpy fruit, which may be extracted from its thorny setting with some difficulty; but its chief value lies in the purity and potability of the water with which the pulpy trunk is stored. The visnaga is widely distributed throughout the Sonoran province and beyond, and extends into eastern Seriland; it is rare west of Desierto Encinas and is practically absent from Isla Tiburon, where it may easily have been exterminated by the improvident Seri during the centuries of their occupancy. Most abundant of all the cacti, and less conspicuous only by reason of comparatively small size, is the cholla (an arborescent *Opuntia*); on many of the sheetflood-carved plains it forms extensive thickets 5 to 8 feet high, the main trunks being 2 to 6 inches in diameter, while dozens or hundreds of gaunt and thorn-covered branches extend 3 to 8 feet in all directions; and it occurs here and there throughout the district from the depths of the valleys and the coast well up to the rocky slope of the sierras. It yields quantities of fruit, somewhat like tunas, but more woody and insipid; this fruit is seldom if ever used for human food, but is freely consumed by herbivores. Much less abundant than the cholla is the nopal, or prickly pear; and there are various other opuntias, often too slender to stand alone and intertwined with stiffer shrubs which lend them support, and many of them yield small berry-like tunas. Another characteristic cactus, widespread as the cholla and abundant in nearly all parts of Seriland save on the rocky slopes, is the okatilla (*Fouquiera splendens*). It consists of half a dozen to a score of slender, woody, and thorn-set branches radiating from a common root, usually at angles of 30° to 45° from the vertical, and ordinarily reaching heights of 10 to 20 feet.

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The pulp masses of the larger cacti, especially the saguaro, sagueso, pitahaya, and cina, are supported by woody skeletons in the form of vertical ribs coincident with the external flutings; within a few years after the death and decay of these desert monsters the skeletons weather out, and the vertical ribs form light and strong and approximately straight bars or shafts, valuable for many industrial purposes; while the slender arms of okatilla are equally valuable, in the fresh condition after removal of the spiny armament, and in the weathered state without special preparation. 137

On many of the higher plain-slopes, especially in eastern Seriland, there are pulpy stemmed shrubs and bushes, sometimes reaching the dignity of trees, which present the normal aspect of exogenous perennials during life, but which are so spongy throughout as to shrink into shreds of bark-like debris shortly after death. These are the torotes of the Sonoran province—common torote (*Jatropha cardiophylla*), torote amarillo (*Jatropha spathulata*), torote blanco (*Bursera microphylla*), torote prieto (*Bursera laxiflora*), torotito (*Jatropha cuneescens*?), etc. These plants grow in the scattered and scraggy tufts characteristic of arid districts (a typical torote tuft appears in left foreground of figure 4); they are protected from evaporation by the usual glazed epidermis, and maintained by the water absorbed during the humid seasons; but they are thornless and are protected from animal enemies by pungent odors, and at least in some cases by toxic juices. Like various plants of the province they are measurably communal—indeed, the torotito appears to be dependent on union with an insect for reproduction, like certain yuccas, and like the cina and (in some degree at least) the saguaro and other cacti.

Along the lower reaches of Rio Bacuache, and in some of the deeper gorges of Sierra Seri and Sierra Kunkaak, grow a few veritable trees of moderately straight trunk and grain and solid wood, such as the guaiacan (*Guaiacum coulteri*) and sanjuanito (*Jacquinia pungens*); both of these fruit, the former in a wahoo like berry of medicinal properties, and the latter in a nut, edible when not quite ripe and forming a favorite rattle-bead when dry. On the flanks of such gorges the slender-branched buraprieta (*Cesalpinia gracilis*) grows up in the shelter of more vigorous shrubs, its branches yielding basketry material, while its fruit is a woody bean much like that of the cat-claw. In like stations there are occasional clumps of yerba mala or yerba de flecha (*Sebastiana bilocularis*), an exceptionally leafy bush growing in straight stems suitable for arrowshafts, and alleged to be poisonous from root to leaf—with inherent probability, since the plant is without the thorny armature normal to the desert. Along the sand-washes, especially about their lower extremities wet only in floods, springs a subannual plant (*Hymenoclea monogyra*) which shrinks to stunted tussocks after a year or more of drought, but flourishes in close set fens after floods; though of acrid flavor and sage-like odor, it is eaten by herbivores in

1: McGee E-5 (1894-1895)1898 NU31 Seri NU31

137 time of need, and it yields abundant seeds, consumed by birds, small animals, and men. About all of the permanent waters not invaded by white men and the white man's stock there are brakes of cane or carrizal (*Phragmites communis* ?); the jointed stems are half an inch to an inch in thickness and 8 to 25 feet in height; the seeds are edible, while the stems form the material for balsas and afford shafts for arrows, harpoons, fire-sticks, etc., and the silica-coated joints may be used for incising tough tissues.

The coasts of Seriland, both insular and mainland, are skirted by zones of exceptionally luxuriant shrubbery, maintained chiefly by fog moisture. Along the mountainous parts of the coast the zone is narrow and indefinite, but on the plains portions it extends inland for several miles with gradually fading characters; this is especially true in the southern portion of Desierto Encinas, where the fog effects may be observed in the vegetation 12 or 15 miles from the coast. Most of the fog fed species are identical with those of the interior, though the shrubs are more luxuriant and are otherwise distinctive in habit. On the Tiburon side of gale-swept El Infiernillo, and to some extent along other parts of the coast, some of these shrubs (notably *Maytenus phyllanthroides*) grow in dense hedge-like or mat-like masses, often yards in extent and permanently modeled by the wind in graceful dune-like shapes. Somewhat farther inland the flatter coastwise zones of Tiburon are rather thickly studded with shrubby clumps from 6 inches to 2 feet high, made up of *Frankenia palmeri* with half a dozen minor communals; while still farther inland follows the prevailing Sonoran flora of mesquite, scrubby paloverde, and chaparral (*Celtis pallida*), etc, only a little more luxuriant than the normal.

Throughout Seriland proper, and especially in the interior valleys of Tiburon, grasses are more prevalent than in other portions of the Sonoran province, their abundance doubtless being due to the rarity of graminiverous animals during recent centuries.

FAUNA

136 Considered collectively, the fauna of the Sonoran province is measurably distinctive (though less so than the flora), especially in the habits of the organisms. The prevailing animals, like the plants of extraneous type, evidently represent genera and species developed under more humid conditions and adjusted to the arid province through a long-continued and severe process of adaptation; and no fundamentally distinct orders or types comparable with the cacti and torotes of the vegetal realm are known. The prime requisite of animal life in the province is ability to dispense with drinking, either habitually or for long intervals, and to maintain structure and function in the heated air despite the exceptionally small consumption of water; the second requisite is ability to cooperate in the marvelously complete solidarity of animal and vegetal life characteristic of subdesert regions. No

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and more than ordinary littoral variety; for the waters of the gulf are warmed by radiation and conduction from its sun-parched basin, while the concentrated tides distribute and stimulate the species and keep the vital streams astir.

Local Features

Considered as a tribal habitat, Seriland comprises four subdivisions of measurably distinct character, viz, (1) the broad desert bounding the territory on the east; (2) the mountainous zone of Sierra Seri; (3) Tiburon island and the neighboring islets; and (4) the navigable straits and bays contiguous to island and mainland.

1. So far as its marginal portions are concerned, Desierto Encinas is a typical valley of the Sonoran province, sparsely dotted with vital colonies of the prevailing type and variegated by the exceptionally luxuriant mesquite forests of the Bacuache and Sonora fans; but the interior of the valley is rendered distinct by the fact that it lies near, if not below, the level of the sea.[1] The central feature is Playa Noriega—a film of brackish water for a few days after each considerable semiannual freshet, a sheet of saline mud for a few weeks later, and for the greater part of the year a salt-crusted aberd 20 square miles in area, level as a floor and unimpressionable as a brick pavement. The playa is rimmed by dunes 10 to 40 feet in height, and about these and along the arroyos which occasionally break into it there is some aggregation of salt-enduring shrubs, evidently sustained in part by the semiannual freshet with its meager vapors and fogs. Outside this rim the surface is exceptionally broken; low dunes and irregularly wandering banks of soft and dust fine sand are interspersed with meandering salt flats much like the central playa, ranging from a few feet in width and a few yards in length up to mappable dimensions, as in the lesser playas lying east of the great one; and many of the dust-banks are honeycombed with squirrel burrows. This annulus of broken surface is narrow on the west, soon passing into okatilla scrub and then

[1] The expedition of 1895, during which Seriland was surveyed, was not provided with apparatus for accurate vertical measurement, and hence altitudes were only approximately determined. The determinations by Mr Johnson, who executed the topographic surveys, indicated that even the lowest part of the valley is somewhat above sea level; but other facts indicate that it actually lies below the level of the waters of the gulf, and forms a miniature homologue of Colorado desert (in southern California): in the first place the central playa, which is undoubtedly flooded occasionally of late semiannually, does not encroach into, and has no channels extending toward, the sea; in the second place it is highly saline; again, the alluvial fans of Rio Bacuache and (especially) of Rio Sonora are so placed as to intercept and dam the trough occupied by Laguna la Cruz in its southern portion and Playa Noriega in its northern portion; concordantly, the detail configuration of the coast indicates marine transgression, apparently due to secular subsidence of the land—though the abundant marine shells of recent species toward the valley-bottom attest recent displacement of the sea. On the whole, the facts seem to indicate that, during recent geologic times, the lower portion of this valley was a shallow gulf extending northward (and probably also southward) from the eastern limit of Bahia Kino; that the importation and deposition of sediment, chiefly by Rio Sonora, outran the secular subsidence of the land so far as to displace the waters of the gulf in its central portion and to separate the northern arm from the sea; and that the waters of this northern arm were subsequently evaporated, disappearing finally in the central playa in which local inflow and evaporation are balanced by the usual mechanism of interior basins.

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into the sagasca forests of the eastern base of Sierra Seri; on the east it is miles in breadth, passing gradually into the normal Sonoran plain; on the south it widens still farther, stretching all the way to Arenales de Gil and Pozo Escalante, and merging into the playa-like mud-flats bordering Laguna la Cruz, into which the gulf waters are sometimes forced by southwesterly gales at high spring tides. Throughout this portion of the desert, marine shells are scattered over the playa-like flats or lodged in the adjacent banks, sometimes in great beds; the vegetation is scantier than usual and largely of salt-loving habit; the mud-flats are usually coated with saline and alkaline crusts, while the dunes are soft and fluffy, and expand into broad belts perforated with the tunnels of the surprisingly abundant rodents. Across this plain of bitter sand-dust lie the two hard land routes to Seriland—the supposed Escalante route of 1700, down the fan of Rio Bacuache and thence by Barranca Salina; and the Encinas route, down the northern border of the Rio Sonora fan and thence by Pozo Escalante to the shores of Bahia Kino.[1]

Desierto Encinas is an impossible human habitat in any proper sense; it is merely a broad and hardly passable boundary between habitats. The hardy stock of the frontier ranchos, pasturing partly on the thorny fruit of the cholla, push far out on the plains, and are sometimes watered for short periods, under strong guards of heavily armed vaqueros, at Barranca Salina; yet the greater part of the expanse is trodden only by the Seri. Two or three ruined frames of Seri jacales and a few graves crown the low knoll near Pozo Escalante, and there are one or two house remnants near Barranca Salina; these are notable not only as the easternmost remaining outposts of Seri occupancy, but because they represent the only known instances in all Seriland of the erection of even temporary houses adjacent to water. Distinct paths, trodden deep by bare Seri feet, radiate from both waters toward the Seriland interior, but no traceable trails extend eastward.

The southern limit of Desierto Encinas is marked either by the broad mud-flats opening into Laguna la Cruz or by the coast of the gulf, the coast cutting the lower portions of the plain being accentuated by a sand-bank 30 or 40 feet high, against which the surf thunders in nearly continuous roar, audible halfway or all the way to Pozo Escalante. A Seri trail skirts the crest of this bank, sending occasional branches into

[1] Both the routes were traversed by the expedition of 1895, the former from the headwaters of Rio Bacuache to the upper portion of its alluvial fan, and thence from the abandoned Rancho Libertad on the lower portion of the fan across Desierto Encinas by way of Barranca Salina. In the northern crossing a light rubble (the first to traverse this portion of the desert), drawn by four horses and aided by several horsemen, was taken from Rancho Libertad across the northern portion of Playa Noriega and thence up Arroyo Mitchell to a point midway between Barranca Salina and Johnson peak, and was brought back over the same route. The Encinas trail from Rancho San Francisco de Costa Rica was traversed four times each way by the same outfit, and once each way by the running gear of a heavy wagon carrying the rude craft (about 1,000 pounds in weight) in which the Seri waters were navigated, this rubble being drawn by 8 to 12 horses, frequently changed. Typical reports of both routes are shown in plate III, the upper figure representing the Encinas trail and the lower a distant view of Sierra Seri, taken from Playa Noriega, in the depths of Desierto Encinas.

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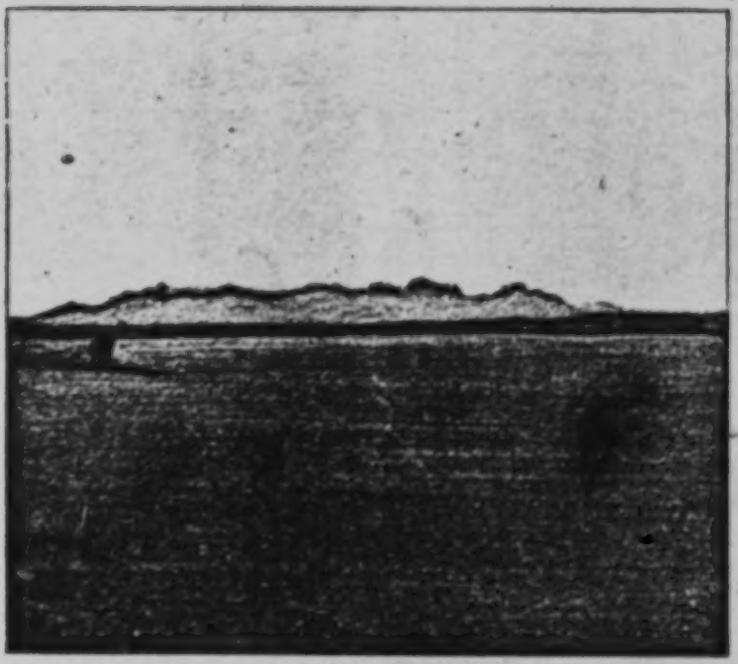
SERI FRONTIER



SIERRA SERI FROM ENCINAS DESERT

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the interior. At Punta Antigualla the bank expands and rises into a great mammillated shell-mound nearly 100 feet high, with several of the crags occupied by more or less ruined jacales; and occasionally occupied houses occur midway thence to the southernmost point of Sierra Seri, and again at the base of the first spur east of Punta Ygnacio. Beyond Punta Antigualla the sweep of the waves is stronger than in Bahia Kino, and the coastal sand-bank is generally higher. Between the rocky buttresses of Punta Ygnacio and the next spur eastward the sand-ridge rises fully 50 feet above mean low tide, and here, as elsewhere, its verge is protected by a fog-fed chaparral thicket with occasional clumps of okatilla and other cacti. Behind the coast barrier lie lagoon-like basins, generally dry and floored with saline silt-beds, though sometimes occupied by briny pools formed through seepage during southwesterly gales; and there are physiographic indications that the northwestward extension of Laguna la Cruz formerly stretched some miles farther than now and lay in the rear of Punta Antigualla in such wise as to form a source of supply of the clam-shells of which the eminence is built.

2. Sierra Seri is a double range, divided mid-length by a broad saddle barely 2,000 feet in height.[1] Like other Sonoran ranges, the nucleal portions are exceedingly rugged and precipitous—at least two of its pinnacles shoot so boldly that they commonly seem to overhang, and have been called leaning peaks. In large part the precipices rise abruptly from a symmetrical dome molded by sheetflooding, much as the insulated buttes rise from the Bacuache fan in northeastern Seriland; so that the tract lying between Desierto Encinas and El Infiernillo is a composite of exceptionally precipitous and exceptionally smooth mountain slopes. One of the Seri trails radiating from Barranca Salina lies across the mid-sierra saddle; others push into several mountain valleys, and the largest leads to Tinaja Trincheras, at the base of Johnson peak, where there are a few low walls of loose-laid rubble, somewhat like those of the trincheras (entrenched mountains) farther eastward—the only structures of the sort seen in Seriland. Toward the southern end of the range lie various trails, the most conspicuous paralleling the coast, either near the shore or over the steep salients, according to the configuration; while here and there ruinous jacales a few yards from the coast attest sporadic habitation. The eastern shore of Bahia Kunkaak from Punta Ygnacio northward reveals a typical geologic section of the Sonoran province: the transgressing waves have carved in the granitic subterrane a broad shelf lying just below mean low tide, and usually stretching several furlongs offshore; this shelf is relieved here and there by remnantal crags of obdurate rocks, cumbered by bowlders and locally sheeted with sand and arkose derived from mechanically disintegrated granite; while the

[1] The northern portion, as seen from the east, is shown in plate III; the southern portion, as seen from the west, appears in the upper part of plate IV, while the southwesternmost point is shown in the lower part of the same plate.

1: McGee E-S (1894-1895)1898 NU31 Seri NU31

There is no such well-studied and semiceremonial apparatus for tuna gathering as, for example, the Papago device made from the ribs of the dead saguaro in accordance with traditional formula. 222 [412]

Perhaps second in importance among the vegetal constituents of Seri diet is the mesquite bean, which is gathered in random fashion whenever a well-loaded tree is found and other conditions favor. The woody beans and still woodier pods are roughly pulverized by pounding with the hupf on any convenient stone used as an ahst (metate or mortar), or, if suitable stones are not at hand, they are carried in baskets or improvised bags to the nearest shore or other place at which stones may be found. The half-ground grist is winnowed in the ordinary way of tossing in a basket; and the grinding and winnowing continue alternately until a fairly uniform bean meal is obtained. So far as was actually observed this is eaten raw, either dry in small pinches or, more commonly, stirred in water to form a thin atole; but expressions at Costa Rica indicated that the meal is sometimes stirred in boiling water or pot-liquor, and thus partially cooked, in times of rest and plenty. [262] 252

Other vegetal products used as food comprise a variety of seeds collected from sedges and grasses growing about the mud-flats of Laguna La Cruz and other portions of the province, as well as the seeds and nuts of the scant shrubbery of shores and mountains; while a local seaweed or kelp is eaten in small quantity, apparently as a condiment, and is sometimes carried on journeys even as far as Costa Rica, where specimens were obtained in 1894. 262

It is of interest to note that one of the most distinctive constituents of the Sonoran flora, and one intimately connected with human life in the great neighboring province of Papagueria, is of negligible rarity in Seriland; this is the visnaga (*Echinocactus*, probably of two or three species), the thorniest of the cacti and the only one containing consumable pulp and sap. This peculiar plant is of no small interest in itself as a striking example of the inverse relation between protective devices of chemical sort (culminating in acrid, offensive, or toxic juices) and the mechanical armaments so characteristic of desert plants;[1] it is of still deeper interest economically as the sole source of water over broad expanses of the desert, and one to which hundreds of pioneers and travelers have been indebted for their lives; and it is of interest, too, as a factor of Papago faith, in which the visnaga ranks among the richer guerdons of the rain gods. Throughout most of Papagueria this cactus is fairly abundant; usually there are several specimens to the square mile of suitable soil (it is not found in playas or on the ruggedest sierras), so that it is always within reach of the sagacious traveler; but it diminishes in abundance toward the borders of Seriland, and not more than a dozen examples were found in the portions of that province traversed by the 1895 expedition. Its rare occurrence, 137

[1] Cf. The Beginning of Agriculture. The American Anthropologist, vol. VIII, Oct., 1895, pp. 350-376.

1: McGee E-5 (1894-1895)1898 NU31 Seri NU31

137 chiefly in the form of wounded and dwarfed specimens, seems to indicate that its original range comprised all Seriland; while its dearth suggests destruction nearly to the verge of extinction by improvident generations better armed with their hupfs and harpoons and shell cups than the subhuman beasts against whom the plant is so well protected.

285 415 Aside from the universally used hupf and ahst (which may be regarded as differentiated implements or tools), the only special device used in connection with vegetal food is the basket, or, rather, basketry tray (illustrated in figure 24). This ware is of the widespread coil type so characteristic of southwestern tribes. The coil is a wisp of stems and splints of a fibrous yet spongy shrub, apparently torote; and the woof consists of paloblanco (?) splints deftly intertwined by aid of an awl. The construction is fairly neat and remarkably uniform: the

FIG. 24—Seri basket.

coiled wisps vary somewhat in size, both intentionally and inadvertently, ranging from an average of three eighths of an inch toward the bottoms of the larger specimens to half that diameter in the smaller specimens and toward the margins of the larger. The initial coil starts in an indefinite knot, rather than a button, at the center; and the spiral is continuous throughout, the final coil being quite deftly worked out to a single splint smoothly stitched to the next lower spiral with the woof splints. The ware is practically water-tight, remarkably strong and resilient, and quite durable in the dry climate of Seriland. Ordinarily the basket is abandoned when the bottom decays or breaks, but an ancient specimen obtained on Isla Tiburon was roughly rebottomed with a patch of sealskin attached by means of sinew. The baskets are notably uniform in shape, though the size varies from 8 or 9 inches to fully 17 inches in diameter.

The most striking feature of the Seri basketry, as of the pottery, is

2: Kroeber E-5 (1930) 1931 NU31 Seri NU31

sounds like an expectable enough mythic idea, but seems involved with McGee's dubious conceptions as to totemism, discussed below. 114 193

The two-pointed fish-spear, with serrated points 6 inches long and spreading 5°, seen by Hardy (McGee, p. 193), is interesting because seemingly unreported in or near the area. 114 227

"Fishing" with staked pelicans who are then fed by free birds, is authenticated by the statement of Venegas for lower California, (McGee, p. 193). [226 231]

No fish nets, hooks, or lines were seen by McGee among the abandoned effects on Tiburon (p. 194). This is in accord with my observation. The abundance of sharks may interfere with net or deep water fishing.

The bow (p. 200) is of *palo blanco;* the release (pls. 28, 29), Mediterranean; the archer's position (pl. 29), with elbow above head, suggests a quick downward shot at a target or game lying on the ground not far away. 114 411

Mesquite, according to McGee (p. 207), is ground on the metate. Sr. Thomson told me of its being pounded in a hole in the ground. The Seri gave me the name a'kaʟa for what I understood to be this earth mortar. According to Sr. Thomson's description, the flour from the first beans cakes and lines the cavity firmly, so that the bulk of the material is secured quite cleanly. In general, mesquite is mortar-pounded rather than metate-ground by the tribes from whom we have records, as is expectable from the woody nature of the beans. 114 252

McGee (p. 207) noted the viznaga cactus, Echinocistus, as rare in the Seri habitat, presumably owing to its use for water by the natives. I made the same observation on the mainland, but Sr. Thomson stated that along the roads the plant is being gathered for candying. 114 137

The one basket described by McGee (p. 208, fig. 24) is bundle-coiled and plain. The only one I saw in use among the Seri was ornamented with a plain reddish band. Sr. Thomson presented me with two which bear patterns (fig. 13), and showed me a photograph of a collection made by Mr. Davis for the Museum of the American Indian, Heye Foundation, nearly all of which were decorated, some fairly elaborately. Several of these are shown by courtesy of that institution in figure 12. As McGee observes, there is obvious resemblance to Southwestern baskets; especially of the Papago, Pima, and Apache. Southern California basketry is less similar. That of Baja California is unknown from specimens, though the mention of water-tight vessels used for winnowing and parching suggests a coiled tray of Seri type. The surviving tribes of Sonora other than the Seri use few baskets distinguishable from those of the non-Indian population. 114 285 [171]

3:Davis & Dawson 2-5 (1922-1940) 1943
MU31 Sect MU31

225 through the shell. The foreshaft was jerked out at the first movement of the animal which was held by the fisherman's line until tired, after which it was either driven ashore or lifted onto the balsa.

No sooner was the quarry landed than the soft undershell was crushed and broken loose with a cobblestone "hupf," and then torn off 264 by the tribespeople with the impetuous fury of blood-crazed carnivorous beasts. The entrails and soft, bloody gore were first consumed, followed, depending upon the proximity of the last meal, by the firmer flesh, all but the infants of the household pounding, tearing and chewing their raw, grisly [252] chunks, stopping to singe or half roast larger pieces only if near satiety. If immediate consumption of the prey was not accomplished, the remnants were carried to the rancheria and there lifted to the top of the jacal to soften in the sun. The reeking carapace was often left indefinitely beside the

[197]

Photo by J. B. Harrison

FIG. 9. PITAHAYA AND SAGUERO CACTI PROVIDE A RICH HARVEST OF FRUITS IN SUMMER.

[p. 199(A)]

3: Davis & Dawson E-5 (1922-1940)1945 NU31 Seri NU31

313
482

FIG. 20. SERI WOMEN BEARING FIRE WOOD TO THE CAMP AT KINO

137

FIG. 21. A MEXICAN TOTUAVA CATCH ON THE BEACH AT KINO

[p.267(A)]

P(Malkin E-S (1953-1955)1962 NU31 Seri NU31

I

INTRODUCTION

[31] [12] [361] [221] [464] The territory discussed in this paper is somewhat larger than the historical area occupied by the Seris. While Seri settlements are limited today to a quite narrow range, the Tiburon Island and the coast of Sonora immediately adjacent to it, they are familiar with a far larger region, owing to their periodic trips, either on their own after fish, turtle and game or, occasionally, in the temporary employ of the Mexican fish-traders and even farmers. The further away from Tiburon perimeter, the lesser their familiarity with a locality.

The area is limited by Hermosillo in the east, Punta Penasco and Porto Libertad in the north, and Nogales in the south, and finally it includes also the coast of Baja California which the Seris sometimes visit. It also includes all of the islands within that area, Tiburon, Patos, Rasa, Angel de la Guarda, San Lorenzo and San Esteban.

● 137 With very minor variations this entire region belongs properly to the Sonoran desert. *Palo Verde, Palo Fierro, Pithaya, Mesquite, Cholla, Sahuaro*, prickly pear, elephant tree and creosote bush are the basic plants. Among the vertebrates, 136 such forms as the Sonoran bighorn, deer, cougar, jumping rat, badger, coyote, skunk, rattlesnake, sidewinder and Gila Monster are most conspicuous and diagnostic. Among the birds are the roadrunner, the raven, as well as many pelagic or littoral birds, the pelican and cormorant among them.

132 The region is one of very low rainfall, limited to the hot summer months, in some places occuring only a few times in a year. Winters are chilly and dry with persistent winds and dust, with the temperature falling down, on rare occasion, to just above the freezing point. Summers are intensely hot, with daily temperatures usually over 100 and the water temperature of the sea along the shore not infrequently as much as 85 degrees. There are great differences between diurnal and nocturnal temperatures, very much influencing the desert life.

134 Within this region there are several different ecological zones or perhaps sub-zones, varying from the alkaline flats like Playa Noriega, and the alkali-and salt-permeated soils of Desemboque to the more bountiful slopes of the mountains and the irrigated mud-flats around Hermosillo.

121 For the sake of distinction, I have selected several of the typical localities or zones as a point of reference either because of their ecological distinctions or because of their significance as a landmark, readily delineating a peculiar habitat. Personally I am familiar only with some of the

[P.1A]

9:Malkin E-5 (1953-1958)1982 MUSI Seri MUSI

*825

Daily Rhythm

Here again data are most fragmentary and available only for seven species. But what information the Seris gave overwhelmingly suggests good orientation in such matters. Six of the species were correctly described as diurnal and only one, the barn owl, as nocturnal. This is with a qualification for the brown pelican. Of it Moreno, who provided the bulk of the ornithological information, said "it flies and feeds in daytime, but when it is hungry and when food is short it'll then feed at night as well."

[115]

Moreno's explanation is somewhat difficult to understand. How does he know that the pelican is hungrier at certain times than at others? But it is true that the brown pelicans occasionally float and fish at night.

But one must consider the limitations of the data. Out of numerous species of owls present in the region, we have information only for one. Nor is there any for the nightjars.

The usual explanation for the birds' inactivity at night is sleep. In few instances the place of rest has been specified. Accordingly, the dove sleeps on trees and the duck ashore.

Habitat Ecology

Some of birds' preferences for particular spots have already been indicated in discussing the nesting habits.

Habitat preferences had been indicated for the vast majority of the species under discussion, in connection with various activities. Almost all shore or marine birds were thus indicated. This knowledge included the curlew and the willet and the sand-piper, all of which were described as "walking along the shore," although nothing else had been said about them. The bittern, the ibis and the egret on the other hand, the Seris think, have a distinct liking for muddy locations and the mangroves—all of which the informants pointedly explained. This is why, they said, they favored Estero Sargente, an area of evil smelling muddy mangroves where they find food and nesting grounds

●[137]

[P. 71A]

123 As a concrete result of that first trip to Tiburon, I secured a
115 *balsa* (boat) made of *carrizo* canes lashed together with native fibre,
501 which *balsa* Mr. Heye said it was the finest one in North America.

[226] This *balsa* was given to me without hesitation, although it furnished one or two families with sea food.

115 I wish to pay tribute to Senor Roberto Thomson who has been my constant companion, friend, guide and interpreter during the past twenty years, on all my trips to Tiburon and various parts of Mexico. I found him absolutely dependable, using excellent judgment in critical situations. He was honest, fair, intelligent, looking out constantly for my safety and comfort always, enduring hardships cheerfully. A better all-round out-door man I have never seen equaled. In short, he is a real *hombre*, and *muy simpatico*.

13
181 Tiburon, or *Shark Island*, long noted for its evil reputation as
153 the home of the most savage and treacherous Indians of North America, lies in latitude 29°north and 112°30' west longitude, in the Gulf of California. It is shaped like a parallelogram about thirty-five miles long and eighteen to twenty miles wide, and lies parallel to the coast of Sonora, Mexico, of which, no doubt, at some remote period, it once formed a part.

It is separated from the mainland, for the most part, by a strait
[127] called *El Infernillo*, or The Little Hell, through which the rising tides pour a resistless flood. It is a desert island and supports a desert arboreal vegetation which includes several varieties of the cactus family and the *mesquite, palo verde, palo fierro, torote, palo blanco, ocotillo* and others. The giant *saguaro, zarbueso* and *pitahalla* (*pit-a-haya*) cactus are found here also.

Two desert ranges run lengthwise of the Island, which, on its westward or windward side, terminate in sea-worn cliffs against whose ramparts dash the heavy breakers of the Gulf, and on its eastern side, by long alluvial aprons from the foot of the mountains, sloping gently down to the lovely shell-strewn beaches. From this side the foot of the mountains lies from two to five miles distant. On this, the leeward side of Tiburon, the sea is much calmer, and often, in the early morning, it is as smooth and placid as a lake, reflecting each rosy, lavender and purple tint of the rugged Sierra Seri along the Sonoran coast, as in a mirror. The exquisite loveliness of marvelous sunrises over the pure limpid waters of the *Estrecho Infernillo* is mystical.

134 The soil is loose and sandy, unsuitable for cultivation, and im-
241 possible for producing domestic crops of any
142 kind.

Giant Saguaro

Pitahaia

123 rancheria of about ten or fifteen huts, half tumbled down, all facing
361 the sea and surrounded by turtle shells and deer bones, and sea shells. Things were dropped wherever they ate. This rancheria was deserted also.

We set sail again and landed on a sandy beach near another deserted rancheria called *Palo Fierro*. We hauled the boat way up and took out all our things and carried them up to the huts. In this place there were twenty-one huts---sometimes three built together. Many of them were in a good state of preservation. They were all in a long row with bleaching bones and turtle shells on all sides. From the inside of one hut I counted thirteen turtle shells around the base. There must have been about a hundred turtle shells here, and a few land tortoises.

123 There were two or three fragments of painted parts of a boat---
[648] probably remains of a boat belonging to seven fishermen who got drunk and landed here, and were all killed by the Seris two years ago. Six months ago a single Seri was captured by some Mexican fishermen and killed in reprisal.

As the wind increased it kicked up an ugly sea and we decided to camp over night. As we were reduced to about six gallons of water, Roberto suggested we take two empty five-gallon cans and go for water. I had offered to stay with the boat but was told the Seris would kill me if they found me alone.

[312] A Seri had told Roberto to follow a certain trail from the rancheria and go between the mountains and he would find a *pozo*, or well, not far away. Ricardo left his private sign and the five of us marched away, following a well-worn trail. For the full distance broken shards of ollas lined the trail at short distances, so we knew we were on
• 137 the right trail. Brush began at the sea shore and we passed various
123 kinds of desert vegetation---several kinds of cactus, especially the *sarbueso*. This starts with a single great trunk two or three feet in diameter, and then branches out like a vase, running up fifteen to twenty or more great columns like the *saguaro*. They were thirty or forty feet high. In some of these were piled a great accumulation of sticks and trash ten feet high or more, and on the top where the sea eagle makes its nest. There were a number of these.

Then we came to the *pitahalla, cholla, ocotillo*, and others, and the strange *terote* tree. This tree is the *Bursura Microphylla*, and has an odor like turpentine. It is a fat, dropsical tree like stuffed sausage, with crooked ungainly branches coming out at all angles. There are three varieties---the *terote colorado, blanco*, and *negro*, according to the color of the cut bark. Another strange tree was the *palo blanco*. Then there was the *palo verde, palo fierro* and *mesquite*. The *mesquite* was rare.

123 A number of signs were marked in the sand. We could not translate
[212] them. We walked single file, rifles in hand, and revolvers handy.

[text continues on p. 155]

123 the sail, a very delicate operation in so cranky a boat, and between rowing and sailing, we reached our destination about eight o'clock, all worn out. Before landing, we called and halloed to notify possible strange Seris that we were friends. After a bite we turned in.

In the morning we started for the *carrisal*, as the water hole was called because *carriso* grows there, as we were almost out of water. The nearest *carrisal* was five miles away. We each had a rifle, revolver and extra cartridges, besides two five-gallon cans and a canteen with some water in it. Nene, Bob's brother, had been there and knew the trail, so we all followed him. The most traveled trail from any camp always led to water.

After going a couple of miles we entered the mountains, and from there on the trail was stony and later rocky as we entered the canyon.
[134] On the way Rafael caught a light gray diamond-back rattler. He held the head with a stick, reached down and grasped it tightly just in back of the mouth. It rattled viciously and twisted itself about his arm, but to no purpose. I took his photo with it coiled about his neck, and the rattle buzzing on his breast. Later he took my photo, I holding the rattler while his tail was coiled around my neck. Later, we killed it and drew the skin off like a kid glove. When we reached camp I filled the skin with sand to cure it, so I could take it home.

[133] There seemed to be several zones of vegetation as we advanced. First came brush, then *pitahalla*, ironwood and various cacti, then *torote*. In the mountains, *mesquite, palo blanco, "wild fig"* and several varieties of brush. The roots of a certain variety of brush furnished us with tea, as our coffee had disappeared. This washed and boiled, made a very good drink.

At the latter end of our arduous trip we had to climb over boulders, and then we arrived at a few pools of water in the rocks and a bunch of *carrisos* in their midst. Beneath the *carrisos* the creek bed was as dry as a bone. We climbed up higher, looking for tanks in the rocky bed. We found one tank but it was filled with green algea. In some places there were great caves in the cliffs and everywhere the scenery was rugged and fascinating. The main mountain above us seemed to rise five hundred feet, with very sparse vegetation. We climbed up some very steep places, almost perpendicular, but as we found no more water we returned and filled our cans.

I had brought shaving tools with me, except soap. However, one of the men knew of a certain root that would produce a lather. This was handy and I mascerated the root. Bob put it in my bandanna and by manipulation produced a good suds. With this I reduced a week's growth of whiskers.

On the way we passed several places where burro deer horns had been stuck in the trees and well bleached out.

Bob and the one-eyed Mexican, Oliverria, carried the water, two

123 *Dono*. It has fallen into sad decay---many buildings in ruins, ditches gone, mill and machinery idle; no water, very few people and a general appearance of slow, peaceful and painless disintegration.

The one redeeming feature is the daughters of the *senor*. Two of them were remaining at home, and in all Sonora I do not believe there are two more charming, modest, industrious as well as lovely maidens than are Laura and Clara Feliz. In addition, they are perfectly artless and very unassuming and retiring. I had with me some slight gifts for Laura and her father whom I had met before, but nothing for Clara, a tall handsome girl of sixteen. Laura thanked me with grace and charm.

After a visit of half an hour we continued on our journey, and after we had travelled about twenty miles more, passing the end mountain of *Siete Cerros*, or Seven Mountains, we reached San Carlos Rancho, another of Ysabel's ranches, containing four and a half square leagues or about forty square miles.

Another very sweet daughter of Feliz's---Lupe, or Guadalupe, lived here. She teaches school with twenty-six Mexican children and a night school for older boys. The school building is a low one-story structure of *carriso* reeds and earth roof. Both wind and sun can come through the cracks. The tables are built of rough boards and the benches had no backs. Everything was as neat and clean as conditions would permit.

At a little Mexican house, whose owner was a friend of Roberto, the wife cooked our meat and coffee and dished up the ever-ready beans. We ate outside the house by the light of a camp fire while a crowd of men and children stood gaping at us and drinking in the news that Roberto brought from the great metropolis. The conversation was a rapid-fire Mexican and sounded like machine guns going off, and this kept up long after Stan and I retired. We slept under a shed. Roberto insisted that I sleep on a bed, instead, with rawhide springs.

The Indians curled up around the camp fire, blankets on top, earth below.

In the morning we ate breakfast in the living room of the stick-mud house, which was poor---so poor, but hospitable. Tortillas of flour and corn, beans and meat were our fare.

We bought a sack of beans and one of corn, twenty pounds each, and then we took a photograph of the school. There were a few extra little girls whose fond mothers had decked out for the occasion. The children had swept the grounds clean and pulled outside the tenderly nursed vines in a jar inside the window, so that they also could be taken.

[131] [132] The dry parched desert is unkind to domestic plants and flowers and these are always blooming in jars or ollas or tin cans under ramadas or in other shade. They secure their share of precious water

[text continues on p. 194]

137
115

Giant Zarbueso cactus and Roberto -
Tiburon Island - March 20, 1924

123 the same as do children and dogs, even though it may be hauled for
[132] six or eight miles on mule-back.
• [137] With gifts and hand-shaking all around, we bade goodbye to Lupe and the children and started on our way.

After leaving San Carlos we travelled through a cholla and giant cactus country until we reached Roberto's ranch at Santa Cruz. We had picked up Pancho Oliverria at San Carlos.

Just before leaving the ranch several men lifted a poor woe-begone mare to her feet. She was so poor and weak she could not get up by herself, but once up she managed to stand and finally staggered out into the *mesquital*, the place of mesquite. One eye was missing and watery matter was oozing out and running down her cheek. A night or two before, a lion caught and destroyed her colt, and probably in an effort to protect it the mare came too near the scene and the lion tore out her eye with one sweep of its paw.

Midway to Santa Cruz we stopped a moment at Blevens ranch *Costa Rica*. Blevens is a large, florid white-haired American who has lived in this country for fifteen or twenty years and hasn't much use for the Seris as they have killed so much of his stock.

[241] At one time he noticed a dead cow which was all swelled up and badly spoiled. No white man could stand the smell. He told some Seris about it, and they flocked around it, and when they had finished all that was left were the hoofs and horns.

Nene's wife cooked dinner for us at their house which was composed of *carrisos* and mud roofed with earth, all supported by mesquite logs. Surrounding it was a hog tight mesquite fence, and in this corral was a fifty-foot deep well which furnished the water supply. Half a bull's hide laced on to an iron hoop and holding about fifteen or twenty gallons, was the water bucket. This was hauled up by a long rawhide rope passing through an over-head block drawn by a mule.

After leaving Santa Cruz with none added to our crew, we wended our way through a maze of mesquite, cottonwood and other timber, gradually working out of the timber to more open country where traveling was not so strenuous. The steering gear was worn so that the old truck would often head for a saguaro or mesquite and stop just short of being smashed.

At last we reached a region of flat baked lake-beds, covered in flood times. Sometimes we could travel fast at fifteen miles and then again we would go in the low where it was soft. About three miles from our destination we took off half our load and piled it to one side and jogged along through a wild desert country with no roads or trails, through chollas, desert brush and terote trees.

123 When we neared a hill of dark volcanic rock a number of Seri In-
312 dians darted out, and with their help we reached a camp near the coast
361 where Roberto had recently located a small well of sweet water.